

## CLAIMS

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1. An open frame display shelf assembly for connection with vertical supports spaced apart a bay width, comprising:

at least two spaced apart parallel elongate base rods extending substantially co-extensive with said bay width;

5 an array of rod beams fixed in transverse relationship to said base rods, and positioned in parallel, mutually spaced relationship a distance selected to provide an open frame surface for supporting merchandise, each said rod beam extending between a shelf forward region and a shelf rearward region, and said array extending substantially along said bay width between first and second shelf side regions, said rod  
10 beams having forward extensions arranged normally to said open frame surface, extending a forward wall height at said shelf forward region, said rod beams having rearward extensions arranged normally to said open frame surface a rearward wall height at said shelf rearward region;

a plurality of elongate forward wall forming rods arranged in parallel  
15 relationship with said base rods and fixed to oppositely disposed portions of said rod beam forward extensions to define a forward receptor gap;

a plurality of elongate rearward wall forming rods arranged in parallel relationship with said base rods and fixed to oppositely disposed portions of said rod beam rearward extensions to define a rearward receptor gap;

20 a plurality of first side load transfer rods fixed to said rod beams at said first shelf side region, having first side wall extensions arranged normally to said open frame surface and extending a first sidewall height;

a plurality of first sidewall forming rods arranged in parallel relationship with said rod beams and fixed to oppositely disposed portions of said load transfer rod  
25 first sidewall extensions to define a first side receptor gap;

a plurality of second side load transfer rods fixed to said rod beams at said shelf second side region and having second sidewall extensions arranged normally to said open frame surface and extending a second sidewall height;

a plurality of second sidewall forming rods arranged in parallel relationship  
30 with said rod beams and fixed to oppositely disposed portions of said load transfer rod second sidewall extensions to define a second side receptor gap;

a first bracket assembly connectable with a first said vertical support and fixed to said first sidewall forming rods for effecting the support thereof from a first of said vertical supports at predetermined angles with respect thereto; and

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2. a second bracket assembly connectable with a second one of said vertical supports and fixed to said second sidewall forming rods for effecting the support thereof from said second vertical support at said predetermined angles.

3. The open frame display shelf assembly of claim 1 including a sign mount connected to said forward wall forming rods, having a generally planar sign engaging surface assemblage and at least two couplers connected between said sign engaging surface assembly and said forward wall forming rods in orientations altering the slope of said sign engaging surface in compensating correspondence with said predetermined angles.

4. The open frame display shelf assembly of claim 2 in which:  
two said forward wall forming rods are spaced apart a predetermined distance; and  
said coupler is configured having a rearwardly disposed semi-circular periphery engageable with said wall forming rods to provide said slope of said sign engaging surface.

5. The open frame display shelf assembly of claim 3 in which:  
said coupler periphery is configured having a sequence of notches each with a notch shape for receiving a said forward wall forming rod, and said coupler having a centrally disposed opening extending therethrough; and  
said coupler being retainable against said two wall forming rods by a flexible strap retainer extending through said centrally disposed opening and about at least one of said two wall forming rods.

6. The open frame display shelf assembly of claim 1 in which:  
four of said elongate forward wall forming rods are configured as two adjacent parallelogramic loops;  
four of said first sidewall forming rods are configured as two adjacent parallelogramic loops; and  
four of said second sidewall forming rods are configured as two adjacent parallelogramic loops.

7. The open frame display shelf assembly of claim 1 in which each said first and second sidewall forming rods are spaced outwardly from said forward and

rearward wall forming rods to form respective first and second access gaps adjacent respective said first and second bracket assemblies.

7. The open frame display shelf assembly of claim 1 including at least one rod-form, D-shape merchandise retaining loop having spaced apart legs insertable within said forward receptor gap

8. The open frame display shelf assembly of claim 1 including a plurality of generally D-shaped, rod-form merchandise guideways having downwardly disposed oppositely disposed legs positionable respectively into said forward and rearward receptor gaps.

9. The open frame shelf assembly of claim 1 in which said shelf assembly comprises:

at least three said parallel elongate base rods including two forward base rods which are positioned in spaced adjacency with said shelf forward region and located for the pivotal support of a forwardly sloping sign support assembly; and

a sign support assembly pivotally supported from a select one of said forward base rods, having a given length and a display width of dimension effective to contact the forward region of a mutually next adjacent lower said shelf assembly mounted upon said vertical supports to effect a sloping orientation for promoting visualization from an eye station remote from said shelf assembly.

10 The open frame shelf assembly of claim 9 in which said sign support assembly comprises:

a flat visual display support having a widthwise dimension corresponding with said display width, and extending between upper and lower edges, having a given length parallel with said base rods and configured with first and second channel assemblies extending along said given length; and

a pivot connector extending from said display support upper edge and including a pivot hook pivotally engageable with a select said forward base rod.

11. The open frame shelf assembly of claim 10 in which:

said display support has front and back faces, said first channel assembly is formed as a dual channel assembly having a forward channel at said front

face and a rearward channel at said rear face and including a channel containing engagement member positioned in spaced relationship from said rearward channel; and said pivot connector includes a connector channel slidably engageable with said rearward channel and including a stabilizer tab engageable with said engagement member.

12. The open frame shelf assembly of claim 1 including an overhead sign assemblage comprising:

a flat overhead visual display support having a sign width extending between upper and lower edges and a length corresponding with said bay width;

a first stanchion having a first insertion end mountable within said first side receptor gap and an oppositely disposed first connector end;

a second stanchion having a second insertion end mountable within said second side receptor gap, and an oppositely disposed second connector end;

a first overhead bracket assembly connected with said first connector end and attached to said overhead visual display support and effecting the support thereof at given angles; and

a second overhead bracket assembly connected with said second connector end and attached to said overhead visual display support and effecting the support thereof at given angles.

13. An open frame display shelf assembly for connection with vertical supports spaced apart a bay width, comprising:

at least two spaced apart parallel elongate base rods extending substantially co-extensive with said bay width;

an array of rod beams fixed in transverse relationship to said base rods, and positioned in parallel, mutually spaced relationship a distance selected to provide an open frame surface for supporting merchandise, each said rod beam extending between a shelf forward region and a shelf rearward region, and said array extending substantially along said bay width between first and second shelf side regions, said rod beams having forward extensions arranged normally to said open frame surface, extending a forward wall height at said shelf forward region, said rod beams having rearward extensions arranged normally to said open frame surface a rearward wall height at said shelf rearward region;

a plurality of elongate forward wall forming rods arranged in parallel relationship with said base rods and fixed to oppositely disposed portions of said rod beam forward extensions to define a forward receptor gap;

a plurality of elongate rearward wall forming rods arranged in parallel relationship with said base rods and fixed to oppositely disposed portions of said rod beam rearward extensions to define a rearward receptor gap;

a plurality of first side load transfer rods fixed to said rod beams at said first shelf side region, having first side wall extensions arranged normally to said open frame surface and extending a first sidewall height;

a plurality of first sidewall forming rods arranged in parallel relationship with said rod beams and fixed to oppositely disposed portions of said load transfer rod first sidewall extensions to define a first side receptor gap;

a plurality of second side load transfer rods fixed to said rod beams at said shelf second side region and having second sidewall extensions arranged normally to said open frame surface and extending a second sidewall height;

a plurality of second sidewall forming rods arranged in parallel relationship with said rod beams and fixed to oppositely disposed portions of said load transfer rod second sidewall extensions to define a second side receptor gap;

first and second bracket assemblies connectable with respective, spaced apart said vertical supports and respective first and second sidewall forming rods, each said bracket assembly comprising:

a first generally flat adjusting component having a connector side connectable with one said vertical support, having a first pivot aperture, a first array of attitude defining first apertures regularly spaced apart along a first arcuate locus positioned a radius distance,  $r_1$ , from the center of said first pivot aperture, adjacent said attitude defining first apertures being symmetrically disposed about first radii of said first arcuate locus defining a first angle  $\theta_1$ ,

a second generally flat adjusting component fixed to first or second said sidewall forming rods, positioned in slidable adjacency with said first flat adjusting component, having a second pivot aperture aligned with said first pivot aperture, having a second array of pairs of second apertures positioned along a second arcuate locus located a said radius distance,  $r_1$ , from the center of said second pivot aperture, each aperture of said pair of said second apertures being symmetrically disposed about second radii of said second locus defining a second angle  $\theta_2$ , corresponding with a predetermined dual connector position spacing,

a first connector insertable in pivot defining relationship through said first and second pivot apertures to pivotally connect said first and second flat adjusting components,

a second connector insertable through a said first aperture of said first array and a said second aperture of a given pair within said second array aligned with said first aperture, and

a third connector insertable through a said first aperture of said first array and a said second aperture of said given pair of said second array.

- 10            14.    The open frame display shelf assembly of claim 13 in which:  
said first angle,  $\theta_1$ , of each said bracket assembly is about  $6^\circ$ ; and  
said second angle,  $\theta_2$ , is about  $18^\circ$ .

- 15            15.    The bracket assembly of claim 14 in which:  
each aperture of said first array of attitude defining apertures and each  
aperture of said second array of pairs of second apertures has a principal dimension of  
about one-fourth inch; and  
said radius distance,  $r_1$ , is within a range of about one to two and one-half  
inches.

- 20            16.    The bracket assembly of claim 14 in which said second angle,  $\theta_2$ , has a  
value which is a multiple of said first angle  $\theta_1$ .

- 25            17.    The bracket assembly of claim 14 in which:  
said first adjusting component includes a third array of attitude defining  
third apertures regularly spaced apart along a third arcuate locus positioned a radius  
distance,  $r_2$ , of value less than said radius,  $r_1$ , from the center of said first pivot aperture,  
adjacent said attitude defining third apertures being symmetrically disposed about third  
radii of said third arcuate locus located intermediate said first radii and defining said first  
30            angle  $\theta_1$ ;

said second adjusting component includes a fourth array of pairs of fourth  
apertures positioned along a fourth arcuate locus, located a said radius distance,  $r_2$ , from  
the center of said second pivot aperture and disposed co-radially with said pairs of  
second apertures;

5 said second connector is insertable through a said third attitude defining aperture of said third array and a fourth aperture of a given pair within said fourth array aligned with said third attitude defining aperture; and

5 said third connector is insertable through a said third attitude defining aperture of said third array and a said fourth aperture of said given pair of said fourth array.

10 18. The open frame display shelf assembly of claim 13 including a sign mount connected to said forward wall forming rods, having a generally planar sign engaging surface assemblage and at least two couplers connected between said sign engaging surface assembly and said forward wall forming rods in orientations altering the slope of said sign engaging surface in compensating correspondence with said predetermined angles.

15 19. The open frame display shelf assembly of claim 18 in which:  
two said forward wall forming rods are spaced apart a predetermined distance; and  
said coupler is configured having a rearwardly disposed semi-circular periphery engageable with said wall forming rods to provide said slope of said sign engaging surface.

20 20. The open frame display shelf assembly of claim 19 in which:  
said coupler periphery is configured having a sequence of notches each with a notch shape for receiving a said forward wall retaining rod, and said coupler  
25 having a centrally disposed opening extending therethrough; and  
said coupler being retainable against said two wall forming rods by a flexible strap retainer extending through said centrally disposed opening and about at least one of said two wall forming rods.

30 21. The open frame display shelf assembly of claim 13 including at least one rod-form, D-shape merchandise retaining loop having spaced apart legs insertable within said forward receptor gap.

35 22. The open frame display shelf assembly of claim 13 including a plurality of generally D-shaped, rod-form merchandise guideways having downwardly disposed

oppositely disposed legs positionable respectively into said forward and rearward receptor gaps.

23. The open frame shelf assembly of claim 13 in which said shelf assembly comprises:

at least three said parallel elongate base rods including two forward base rods which are positioned in spaced adjacency with said shelf forward region and located for the pivotal support of a forwardly sloping sign support assembly; and

a sign support assembly pivotally supported from a select one of said forward base rods, having a given length and a display width of dimension effective to contact the forward region of a mutually next adjacent lower said shelf assembly mounted upon said vertical support to effect a sloping orientation for promoting visualization from an eye station remote from said shelf assembly.

24. The open frame shelf assembly of claim 23 in which said sign support assembly comprises:

a flat visual display support having a widthwise dimension corresponding with said display width, and extending between upper and lower edges, having a given length parallel with said base rods and configured with first and second channel assemblies extending along said given length; and

a pivot connector extending from said display support upper edge and including a pivot hook pivotally engageable with a select said forward base rod.

25. The open frame shelf assembly of claim 24 in which:

said display support has front and back faces, said first channel assembly is formed as a dual channel assembly having a forward channel at said front face and a rearward channel at said rear face and including a channel containing engagement member positioned in spaced relationship from said rearward channel; and

said pivot connector includes a connector channel slidably engageable with said rearward channel and including a stabilizer tab engageable with said engagement member.

26. The open frame shelf assembly of claim 1 including an overhead sign assemblage comprising:

a flat overhead visual display support having a sign width extending between upper and lower edges and a length corresponding with said bay width;



a first stanchion having a first insertion end mountable within said first side receptor gap and an oppositely disposed first connector end;

a second stanchion having a second insertion end mountable within said second side receptor gap, and an oppositely disposed second connector end;

a first overhead bracket assembly connected with said first connector end and attached to said overhead visual display support and effecting the support thereof at given angles; and

a second overhead bracket assembly connected with said second connector end and attached to said overhead visual display support and effecting the support thereof at given angles.

27. A display shelf system wherein shelves from uppermost to lowermost are connectable with vertical supports spaced apart a bay width, comprising:

a plurality of shelves, each comprising:

at least three spaced apart parallel elongate base rods, including two forward base rods extending substantially co-extensive with said bay width;

an array of rod beams fixed in transverse relationship to said base rods, and positioned in parallel, mutually spaced relationship a distance selected to provide an open frame surface for supporting merchandise, each said rod beam extending between a shelf forward region and a shelf rearward region, and said array extending to define a shelf depth substantially along said bay width between first and second shelf side regions, said rod beams having forward extensions arranged normally to said open frame surface extending a forward wall height at said shelf forward region to define sign contact surfaces, said rod beams having rearward extensions arranged normally to said open frame surface a rearward wall height at said shelf rearward region;

at least two elongate forward wall forming rods arranged in parallel relationship with said base rods and fixed to said rod beam forward extensions to define therewith a forward wall;

a plurality of elongate rearward wall forming rods arranged in parallel relationship with said base rods and fixed to said rod beam rearward extensions to define therewith a rearward wall;

a plurality of first side load transfer rods fixed to said rod beams at said first shelf side region, having first side wall extensions arranged normally to said open frame surface and extending a first sidewall height;

a plurality of first sidewall forming rods arranged in parallel relationship with said rod beams and fixed to said load transfer rod first sidewall extensions to define a first side wall;

5 a plurality of second side load transfer rods fixed to said rod beams at said shelf second side region and having second sidewall extensions arranged normally to said open frame surface and extending a second sidewall height;

a plurality of second sidewall forming rods arranged in parallel relationship with said rod beams and fixed to said load transfer rod second sidewall extensions to define a second side wall;

10 a first bracket assembly connectable with a first said vertical support and fixed to said first sidewall forming rods for effecting the support of said shelf surface, from a first of said vertical supports at predetermined angles with respect to horizontal;

a second bracket assembly connectable with a second one of said vertical supports and fixed to said second sidewall forming rods for effecting the support of said shelf surface from said second vertical supports at said predetermined angles; and

20 a plurality of sign support assemblies, each sign support assembly having an upper edge and a lower edge spaced therefrom a display width, having an inner surface and an outer display surface, having an effective length corresponding with said bay width, and including a connector assembly extending from said upper edge and pivotally engaged with a select one of said forward base rods;

one said sign support assembly being pivotally coupled with a said shelf of said system from uppermost to a shelf adjacent said lowermost shelf; and

25 said sign support assemblies having a said display width of dimension effective to effect contact of said inner surface thereof with the said sign contact surface of a next adjacent lower shelf of said system.

28. The display shelf system of claim 27 in which said shelf depth of said lowermost shelf is greater than the shelf depth of the other shelves of said plurality of shelves.

29. The display shelf system of claim 27 in which said first and second bracket assemblies support said shelf surface at select acute angles extending below horizontal.

30. The display shelf system of claim 27 in which:

5 a given said shelf includes a merchandise divider assembly mountable over said open frame surface and dividing said shelf along said bay width into bins each having a bin length parallel with said base rods; and

each said sign support assembly is formed of discrete subassemblies having a subassembly length corresponding with said bin length and pivotally coupled with said shelf next upwardly adjacent to said given shelf.

31. The display shelf system of claim 27 in which said sign support assembly comprises:

10 a flat visual display support having a widthwise dimension corresponding with said display width, and extending between upper and lower edges, having a given length parallel with said base rods and configured with first and second channel assemblies extending along said given length; and

15 a pivot connector extending from said display support upper edge and including a pivot hook pivotally engageable with a select said forward base rod.

32. The display shelf system of claim 31 in which:

20 said display support has front and back faces, said first channel assembly is formed as a dual channel assembly having a forward channel at said front face and a rearward channel at said rear face and including a channel containing engagement member positioned in spaced relationship from said rearward channel; and

said pivot connector includes a connector channel slidably engageable with said rearward channel and including a stabilizer tab engageable with said engagement member.

33. The display shelf system of claim 27 in which:

said first sidewall forming rods are fixed to oppositely disposed portions of said load transfer rod first sidewall extensions to define a first receptor gap;

30 said second sidewall forming rods are fixed to oppositely disposed portions of said load transfer rod second sidewall extensions to define a second side receptor gap; and including:

an overhead sign assemblage comprising:

a flat overhead visual display support having a sign width extending between upper and lower edges and a length corresponding with said bay width;

a first stanchion having a first insertion end mounted within the said first side receptor gap of said uppermost shelf, and an oppositely disposed first connection end;

5 a second stanchion having a second insertion end mounted within said second side receptor gap of said uppermost shelf, and an oppositely disposed second connection end;

a first overhead bracket assembly connected with said first connector end and attached to said overhead visual display support and effecting the support thereof at given angles; and

10 a second overhead bracket assembly connected with said second connector end and attached to said overhead visual display support and effecting the support thereof at given angles.

15 34. The display shelf system of claim 27 including a sign mount connected to said forward wall forming rods of said lowermost shelf, having a generally planar sign engaging surface assemblage and at least two couplers connected between said sign engaging surface assembly and said forward wall forming rods in orientations altering the slope of said sign engaging surface to be directly visual from a human eye station located in spaced, relationship with said display shelf system.

20 35. The display shelf system of claim 34 including two said forward wall forming rods are spaced apart a predetermined distance; and

25 said coupler is configured having a rearwardly disposed semi-circular periphery engageable with said wall forming rods to provide said slope of said sign engaging surface.

30 36. The display shelf system of claim 35 in which:  
said coupler periphery is configured having a sequence of notches each with a notch shape for receiving a said forward wall retaining rod, and said coupler having a centrally disposed opening extending therethrough; and

said coupler being retainable against said two wall forming rods by a flexible strap retainer extending through said centrally disposed opening and about at least one of said two wall forming rods.

37. The method for displaying a plurality of merchandise items having a common functional utility and associated with a plurality of discrete product identifying visual patterns, comprising the steps of:

5 (a) providing first and second vertical supports spaced apart a bay width;

10 (b) providing a plurality of shelves connectable with said first and second vertical supports from uppermost to lowermost, each comprising a support surface for supporting said merchandise extending a shelf depth between a shelf forward region and wall, said wall having an upwardly disposed sign contact surface, and a shelf rearward region, and having a shelf length corresponding with said bay width extending between first and second shelf sides, a first bracket assembly connectable with said first vertical support and fixed to said first shelf side adjacent said shelf rearward region for effecting the support of said support surface from said first vertical support at predetermined angles with respect to horizontal, a second bracket assembly connectable with said second vertical support and fixed to said second shelf side adjacent said shelf rearward region for effecting the support of said support surface from said second vertical support at predetermined angles with respect to horizontal;

20 (c) providing a sign assemblage with each of said shelves from uppermost to next adjacent said lowermost, each said sign assemblage having an upper edge and a lower edge spaced therefrom a display width, having an inner surface and an outer display surface, having a select display length along said bay width, and said upper edge being pivotally engagable with the said shelf forward region;

25 (d) mounting said shelves by said first and second bracket assemblies to respective said first and second vertical supports with an inter-shelf spacing selected to enhance the volume of merchandise carried by said support surfaces;

(e) assigning a bin region specific to each said merchandise item at each said support surface, each said bin region having a bin length along said bay width;

30 (f) connecting a said sign assemblage having a said select display length corresponding with said bin length for each said bin region to a said support surface forward region of the next adjacent upwardly disposed shelf in alignment with said bin region and selecting said display width as having a dimension effective to rest said inner surface in freely abutable engagement with the said upwardly disposed sign contact surface of a next adjacent lower shelf effective to promote the viewing of said sign assemblage outer display surface from an eye station located in spaced apart relationship to said plurality of shelves; and

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(g) applying a display to each said sign contact surface, said display corresponding with that said product identifying visual pattern associated with the said merchandise items at said assigned bin region.

5           38.     The method of claim 37 including the step of:

(h)     adjusting said shelves at said first and second bracket assemblies to cause said support surface thereof to assume acute angles below said horizontal said angles being selected to promote said viewing of said sign assemblage outer display surface from said eye station.

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          39.     The method of claim 37 including the steps of:

(l)     providing an overhead sign assemblage comprising:

          a flat overhead visual display support having a sign width extending between upper and lower edges and a length corresponding with said bay width;

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          a first stanchion having a first end mountable within a said first shelf side and an oppositely disposed first connection end;

          a second stanchion having a second insertion end mountable with a said second shelf side and an oppositely disposed second connection end;

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          a first overhead bracket assembly connected with said first connector end and attached to said overhead visual display support and effecting the support thereof at given angles;

          a second overhead bracket assembly connected with said second connector end and attached to said overhead visual display support and effecting the support thereof at given angles;

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(j)     mounting said first and second connection ends of said overhead sign assemblage to respective said first and second shelf sides of said uppermost shelf;

(k)     applying an overhead display to said flat overhead visual display support;

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(l)     adjusting said overhead visual display support at said first and second overhead brackets and said first and second brackets to promote viewing said overhead display from said eye station.

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          40.     The method of claim 37 including the step of:

(m)     providing said lowermost shelf with a shelf depth which is greater than the shelf depth of the other shelves of said plurality of shelves.

41. The method of claim 37 including the step of:

(n) positioning said plurality of shelves upon said first and second vertical supports with a mutual vertical spacing limited to hand removal of said merchandise items therefrom.

42. A display shelf assembly for connection with vertical supports spaced apart a bay width, comprising:

a base region extending substantially coextensive with said bay width for supporting merchandise and extending between a shelf forward region and a shelf rearward region;

a forward wall extending from said shelf forward region, formed of two mutually parallel forward wall forming rods substantially parallel with said base region;

a first bracket assembly connectable with a first said vertical support and supporting said base region therefrom at predetermined angles with respect thereto;

a second bracket assembly connectable with a second one of said vertical supports and supporting said base region therefrom at said predetermined angles; and

a sign mount connected to said forward wall forming rods, having a generally planar sign engaging surface assemblage and at least two couplers connected between said sign engaging surface assembly and said forward wall forming rods in orientations altering the slope of said sign engaging surface in compensating correspondence with said predetermined angles.

43. The display shelf assembly of claim 42 in which:

said two forward wall forming rods are spaced apart a predetermined distance; and

each said coupler is configured having a rearwardly disposed semi-circular periphery engageable with said wall forming rods to provide said slope of said sign engaging surface.

44. The open frame display shelf assembly of claim 43 in which:

said coupler periphery is configured having a sequence of notches each with a notch shape for receiving a said forward wall forming rod, and said coupler having a centrally disposed opening extending therethrough; and

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said coupler being retainable against said two wall forming rods by a flexible strap retainer extending through said centrally disposed opening and about at least one of said two wall forming rods.

5 45. The display shelf assembly of claim 42 in which:

said two forward wall forming rods are spaced apart a predetermined distance;

each said coupler is configured having a rearwardly disposed semi-circular periphery with a sequence of notches, each with a notch shape selected for abutting engagement with a said forward wall forming rod; and

10 said sign engaging surface assembly includes a flanged connector extending therefrom and mechanically coupled with each said coupler.

15 46. The display shelf assembly of claim 45 in which each said coupler includes a forwardly disposed slot slidably engageable with said rod flanged connector.

20 47. The display shelf assembly of claim 45 in which said sign engaging surface assembly includes two, oppositely disposed channels for slidably receiving a sign.